

SOUTH FORK BEECH CREEK

CENTRE COUNTY

**WATER QUALITY STANDARDS REVIEW
AQUATIC LIFE USE ATTAINABILITY EVALUATION**

**Segment: Basin, Stinktown Run to Mouth
Drainage List: L
Stream Code: 22763**

**WATER QUALITY MONITORING AND ASSESSMENT SECTION (ADK/RMR)
DIVISION OF WATER QUALITY ASSESSMENT AND STANDARDS
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**MAY 1998
REVISED JULY 2001**

SOUTH FORK BEECH CREEK, CENTRE COUNTY DRAINAGE LIST L

BACKGROUND

South Fork Beech Creek is a tributary to North Fork Beech Creek in the West Branch Susquehanna River basin. South Fork Beech Creek basin from Stinktown Run to its confluence with North Fork Beech Creek was inadvertently omitted from Chapter 93 and, therefore, was evaluated to determine the correct water use designation. The basin has a drainage area of approximately 18 square miles (Figure 1). Approximately 90% of the basin is forested, 5% is residential/hunting camps, and 5% is commercial. There are State Game Lands in the basin, but no other state or federal property is present. Abandoned strip mines also are present in the watershed.

A survey was conducted in the fall of 1997 by the Bureau of Watershed Conservation to determine the stream's existing use based on the indigenous fishery and macroinvertebrate community. Evaluations of these collections plus basic water chemistry were used to determine the proper aquatic life use designation of South Fork Beech Creek from Stinktown Run to its mouth.

METHODS

Three sampling sites (Figure 1 & Table 1) were surveyed on October 2, 5, and 6, 1997 for fish and macroinvertebrate assessment. Approximately 100 meters of stream were evaluated at each location using a backpack electrofisher to determine fish species and densities. Fish were returned to South Fork Beech Creek following the recording of data. Benthic macroinvertebrate populations were sampled using a d-frame kick-net (Modified EPA Rapid Bioassessment Protocol) in riffle areas at each station. Samples were preserved in 95% ethanol, transported to the laboratory and identified to the lowest level practicable (genus when possible). Grab water samples were collected at each location for laboratory analysis.

FINDINGS

Water Quality and Uses

No long-term water quality data were available to allow a direct comparison to water quality criteria. Based on grab samples, water quality at SFB2 and SFB3 was generally good with an average field pH of 6.4 (Table 2). Alkalinity values were low at all three sites indicating a low buffering capacity for the stream. These alkalinity values are probably naturally occurring. SFB1 had higher levels of acidity, hardness, manganese, nickel, sulfate, zinc, and lower alkalinity than SFB2 and SFB3, suggesting the presence of some acid mine drainage. However, since the instantaneous nature of the grab samples precludes comparison to applicable water quality criteria, the indigenous aquatic community is a better indicator of long-term conditions and is used as a measure of water quality and ecological significance.

Aquatic Biota

Benthic macroinvertebrates were collected at all three stations (Table 3). Good taxonomic diversity occurred at SFB2 (29 taxa) and SFB3 (28 taxa) with 22 and 16 taxa respectively of the Ephemeroptera, Plecoptera, and Trichoptera (EPT) groups. A total of 8 taxa were found at SFB1 but one taxon, *Diplectrona*, which has a low Hilsenhoff value (indicative of good water quality standards) was abundant.

Cold water fish species were collected at all stations (Table 4). Naturally reproducing brook trout were collected at station SFB1 and SFB2. Several year classes of brown trout were collected at SFB2 and SFB3. The presence of brook trout, brown trout, sculpin, and blacknose dace indicate that this section of the South Fork Beech Creek supports a cold water fishery.

BIOLOGICAL USE QUALIFICATIONS

The biological data indicate that this area of South Fork Beech Creek supports Cold Water Fishes (CWF) as defined at §93.3, based on the presence of naturally reproducing brook and brown trout. The presence of stoneflies, a coldwater benthic macroinvertebrate, is another biological indicator of the CWF use of this stream.

No special conditions were found during the survey that would qualify this area of South Fork Beech Creek as a surface water of exceptional ecological significance.

PUBLIC RESPONSE AND PARTICIPATION SUMMARY

The Department provided public notice of this redesignation evaluation and requested any technical data from the general public through publication in the Pennsylvania Bulletin on April 22, 2000 (30Pa.B 2071). A similar notice was also published in the Centre Daily Times on April 24, 2000. In addition, Boggs, Snow Shoe, and Union Townships were all notified of the evaluation in a letter dated April 19, 2000. The Centre Count Planning Commission was also notified at the same time. No data on water chemistry, instream habitat, or the aquatic community were received in response to these notifications.

A draft of this report was submitted to the above stakeholders, along with a request for comments, on September 20, 2002. No comments were received in response to this request.

RECOMMENDATION

The Department recommends that South Fork Beech Creek basin from Stinktown Run to the mouth be designated as CWF. This designation affects approximately 13.5 stream miles, and provides a level of protection consistent with South Fork Beech Creek's aquatic conditions.

Figure 1: South Fork Beech Creek

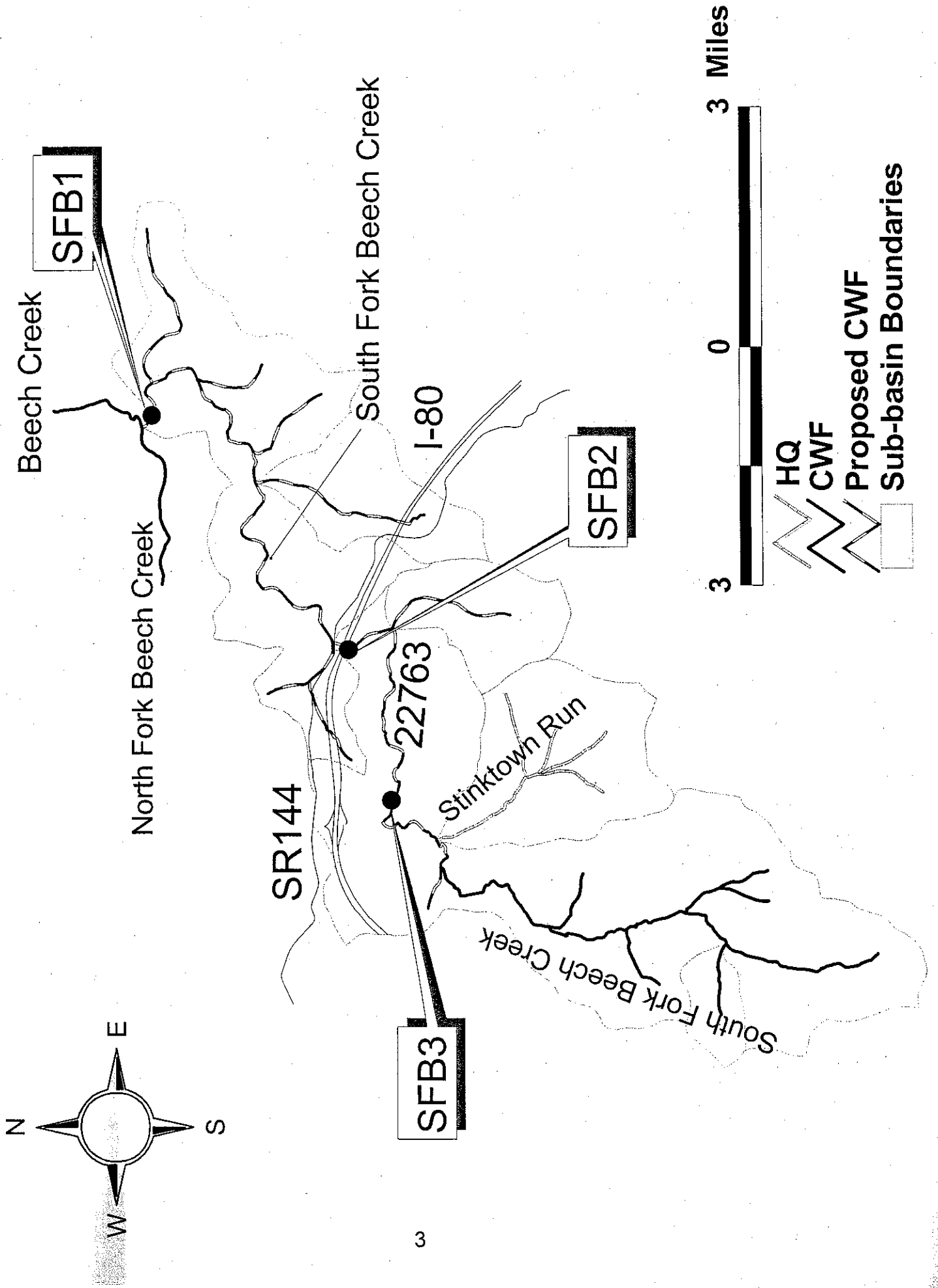


TABLE 1
COLLECTION STATIONS
SOUTH FORK BEECH CREEK, CENTRE COUNTY

Fish and benthic macroninvertebrate collection stations on South Fork Beech Creek, Centre County, October 5 and October 6, 1997.

<u>STATION</u>	<u>LOCATION</u>
<u>SFB1</u>	South Fork Beech Creek just upstream of confluence with North Fork Beech Creek Latitude: 41 02 55 Longitude: 77 52 04
<u>SFB2</u>	South Fork Beech Creek just upstream of Rt. 144 bridge crossing Latitude: 41 01 22 Longitude: 77 54 15
<u>SFB3</u>	South Fork Beech Creek approximately 0.5 mile downstream of Stinktown Run Latitude: 41 01 02 Longitude: 77 55 58

TABLE 2
WATER CHEMISTRY¹
SOUTH FORK BEECH CREEK, CENTRE COUNTY
OCTOBER 5 & 6, 1997

STATION	SFB1	SFB2	SFB3
Field Parameters			
Temp (°C)	18.1	14.5	18.4
pH (std units)	4.73	6.32	6.53
Cond (µmhos)	118	67	70.6
Diss. O ₂	9.9	11.2	9
Laboratory Parameters			
pH	6	6.2	6.2
Alkalinity	4	8.4	8.8
Acidity	5.2	1.4	1.2
Hardness	24	11	10
T Diss Sol.	190	38	190
Susp. Sol.	2	8	2
NH ₃ , -N	<.02	<.02	<.02
NO ₂ , -N	<.01	<.01	<.01
NO ₃ , -N	0.16	0.1	0.13
Total P	<0.02	<0.02	<0.02
Ca	6.2	3.53	3.6
Mg	2.06	1.18	1.16
Chlorides	20	10	10
SO ₄	12	<10	<10
As*	<4.0	<4.0	<4.0
As Diss	<4.0	<4.0	<4.0
Cd*	<0.2	<0.2	<0.2
Cd Diss	<0.2	0.31	0.21
Hex Cr*	<10	<10	<10
Cr*	<50	<50	<50
Cu*	<4.0	<4.0	<4.0
Cu Diss	<4.0	<4.0	<4.0
Fe*	43	177	541
Pb*	<1.0	<1.0	<1.0
Pb Diss	<1.0	<1.0	<1.0
Mn*	245	43	68
Ni*	5.5	<4.0	<4.0
Ni Diss	5.7	<4.0	<4.0
Zn*	15.1	<5.0	<5.0
Zn Diss	16.9	5	5
Al*	101	72.5	139

¹-Except for pH & conductance and indicated otherwise, all values are total concentrations in mg/l

*-Total concentrations in µg/l

TABLE 3
BENTHIC MACROINVERTEBRATE COLLECTIONS
SOUTH FORK BEECH CREEK, CENTRE COUNTY

Benthic macroinvertebrates collected at Stations SFB1 (October 5, 1997), SFB2 (October 6, 1997) and SFB3 (October 2, 1997) on South Fork Beech Creek, Centre County.

TAXA	Station SFB1	Station SFB2	Station SFB3
PLECOPTERA (Stoneflies)			
Capniidae <i>Paracapnia sp.</i>		P	
Chloroperlidae -	R		
Leuctridae <i>Leuctra sp.</i>		P	R
Peltoperlidae <i>Peltoperla/Tallaperla sp.</i>	R	R	P
Perlidae <i>Acroneuria sp.</i>		C	C
Perlidae <i>Paragnetina sp.</i>		P	
Pteronarcyidae <i>Pteronarcys</i>		P	
EMPHEMEROPTERA (Mayflies)			
Baetidae <i>Acentrella sp.</i>		P	R
Baetidae <i>Baetis sp.</i>		C	R
Baetiscidae <i>Baetisca sp.</i>		R	R
Ephemerellidae <i>Ephemerella sp.</i>			R
Ephemerellidae <i>Eurylophella sp.</i>		P	P
Ephemeridae <i>Ephemera sp.</i>		P	R
Heptageniidae <i>Epeorus sp.</i>		C	
Heptageniidae <i>Stenonema sp.</i>		C	A
Leptophlebiidae <i>Paraleptophlebia sp.</i>		C	R
TRICHOPTERA (Caddisflies)			
Glossosomatidae <i>Glossosoma sp.</i>		R	
Hydropsychidae <i>Cheumatopsyche sp.</i>		R	A
Hydropsychidae <i>Diplectrona sp.</i>	A		
Hydropsychidae <i>Hydropsyche sp.</i>	R	C	C
Lepidostomatidae <i>Lepidostoma sp.</i>		R	
Leptoceridae <i>Mystacides sp.</i>		R	
Limnephilidae -		R	
Philopotamidae <i>Dolophilodes sp.</i>		A	C
Polycentropidae <i>Polycentropus sp.</i>			R
Rhyacophilidae <i>Rhyacophila sp.</i>		R	P
COLEOPTERA (Beetles)			
Elmidae <i>Optioservus sp.</i>		R	P
Elmidae <i>Oulimnius sp.</i>		R	R
Elmidae <i>Promoresia sp.</i>	R	C	P
Elmidae <i>Stenelmis sp.</i>			R
Psephenidae <i>Ectopria sp.</i>			R
ODONATA (Dragonflies/Damselflies)			
Gomphidae -		R	R
Aeshnidae <i>Boyeria sp.</i>			R
MEGALOPTERA			
Corydalidae <i>Nigronia sp.</i>			R
Sialidae <i>Sialis sp.</i>			R
DIPTERA (Flies)			
Chironomidae -	C	P	P
Simuliidae <i>Simulium sp.</i>	R	R	
Tipulidae <i>Dicranota sp.</i>			R
Tipulidae <i>Hexatoma sp.</i>		P	P
Tipulidae <i>Limonia sp.</i>	R		
TOTAL TAXA	8	29	28

Relative Abundance: Rare (1-2) Present (3-9) Common (10-24) Abundant (25-100)

TABLE 4
FISH COLLECTIONS
SOUTH FORK BEECH CREEK, CENTRE COUNTY

Fish collected at Stations SFB1 (October 5, 1997), SFB2 (October 6, 1997) and SFB3 (October 5, 1997) on South Fork Beech Creek, Centre County.

<u>SPECIES/SIZE CLASS</u>	<u>SFB1</u> (FISH COLLECTED)	<u>SFB2</u> (FISH COLLECTED)	<u>SFB3</u> (FISH COLLECTED)
Brook Trout			
3- 4 in	3	5	
4- 5 in		1	
5- 6 in		2	1
6- 7 in		2	
9- 10 in		1	
Totals	3	11	1
Brown Trout			
3- 4 in		1	1
4- 5 in			1
6- 7 in		1	
7- 8 in		1	1
8- 9 in		3	
10- 11 in		2	
12- 13 in		1	
Totals		9	3
Blacknose dace		52	34
Sculpin		31	2
Longnose dace		1	
Creek chub		1	2
Tesselated darter		5	28
Cutlips Minnow			1
White sucker		7	27
Total Taxa	1	8	8